

Case 3796

## CLAIMS

- 5 1. Pyrotechnical gas-generating material for gas-actuated car safety devices such as air bags, belt  
tighteners, etc., characterized in that it  
comprises 5-95 wt% of guanyl urea dinitramide and  
10 5-50 wt% of a solid or gaseous oxygen-rich  
substance whose presence is sufficient to ensure  
an oxygen excess during the combustion of the gas-  
generating material.
- 15 2. Pyrotechnical gas-generating material according to  
Claim 1, characterized in that the amount of the  
solid and/or gaseous oxygen-rich substance in it  
is such that it can burn at least the greater part  
of the carbon monoxide (formed in the combustion  
of guanyl urea dinitramide) into carbon dioxide,  
20 so that the amount of residual carbon monoxide is  
well below the limit stipulated in the automobile  
sector.
- 25 3. Pyrotechnical gas-generating material according to  
Claim 1 or 2, characterized in that, apart from  
guanyl urea dinitramide and an oxygen-rich  
substance, it also contains a combustion moderator  
that increases the rate of burning of the gas-  
generating material.
- 30 4. Pyrotechnical gas-generating material according to  
Claim 3, characterized in that the combustion  
moderator in it is finely divided metallic boron,  
used in an amount of up to 10 wt%.
- 35 5. Pyrotechnical gas-generating material according to  
Claim 4, characterized in that the combustion  
moderator in it is finely divided metallic boron,  
used in an amount of 0.5-3 wt%.

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6. Pyrotechnical gas-generating material according to Claim 1 or 2, characterized in that the combustion moderator in it is guanidine dinitramide, used in an amount of up to 90 wt%.
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7. Pyrotechnical gas-generating material according to any one of Claims 1-6, characterized in that it also contains a binder in an amount not exceeding 10 wt%, calculated on the total amount of the solids.
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8. Pyrotechnical gas-generating material according to any one of Claims 1-7, characterized in that the said oxygen-rich solid material is composed of one or more substances chosen from one or more of the following groups:
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- 1) nitrates, perchlorates and permanganates of alkali metals
  - 2) oxides of iron, nickel, cobalt and metals in the manganese group
  - 20 3) oxides of transition metals in Groups 7-12 of the Periodic Table.
9. Pyrotechnical gas-generating material that is intended for actuating car safety devices and is designed for use in hybrid gas-generating compositions that contain, apart from the pyrotechnical gas-generating material, also a preferably oxygen-containing compressed gaseous component that is released simultaneously with the actuation of the pyrotechnical composition and which subsequently shares the function of the pyrotechnically formed gas and can furthermore also react with the latter, characterized in that
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- it comprises 5-95 wt% of guanyl urea dinitramide, up to 90 wt% of a combustion moderator to increase the rate of burning of the gas-generating material, and an oxygen-rich solid substance chosen from one or more of the following groups

and present in an amount of 5-50 wt%, calculated on the total amount:

- 1) nitrates, perchlorates and permanganates of alkali metals
  - 5 2) oxides of iron, nickel, cobalt and metals in the manganese group
  - 3) oxides of transition metals in Groups 7-12 of the Periodic Table,
- 10 together with a binder that is compatible with the other constituents and is present in an amount of up to 10 wt%, calculated on the amount of solid substances, and where the compressed gas present in the hybrid gas generator comprises a sufficient amount of oxygen to ensure, jointly with the
- 15 oxygen-rich solid substance, the combustion of the greater part of the carbon monoxide (formed in the combustion of the guanyl urea dinitramide) into carbon dioxide, so that the amount of residual carbon monoxide is well below the limit stipulated
- 20 in the automobile sector.
10. Pyrotechnical gas-generating material according to Claim 9, characterized in that it comprises, as the combustion moderator, up to 95 wt% of
- 25 guanidine dinitramide, together with an oxygen-rich solid substance, used in an amount of the order of magnitude of 10 wt%.
11. Pyrotechnical gas-generating material according to Claim 9, characterized in that it comprises, as the combustion moderator, up to 10 wt% and preferably 0.5-3 wt% of finely divided metallic boron, together with up to 50 wt% of an oxygen-rich solid substance.
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12. Pyrotechnical gas-generating material according to Claims 1-11, characterized in that it is pressed into tablets, possibly with a binder whose total amount - if used - does not exceed 10 wt%.
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